Conserving Natural and Cultural Assets

Strategies for the Green
Infrastructure of
Kilmarnock, Virginia

by the Greenlands Class - University of Virginia
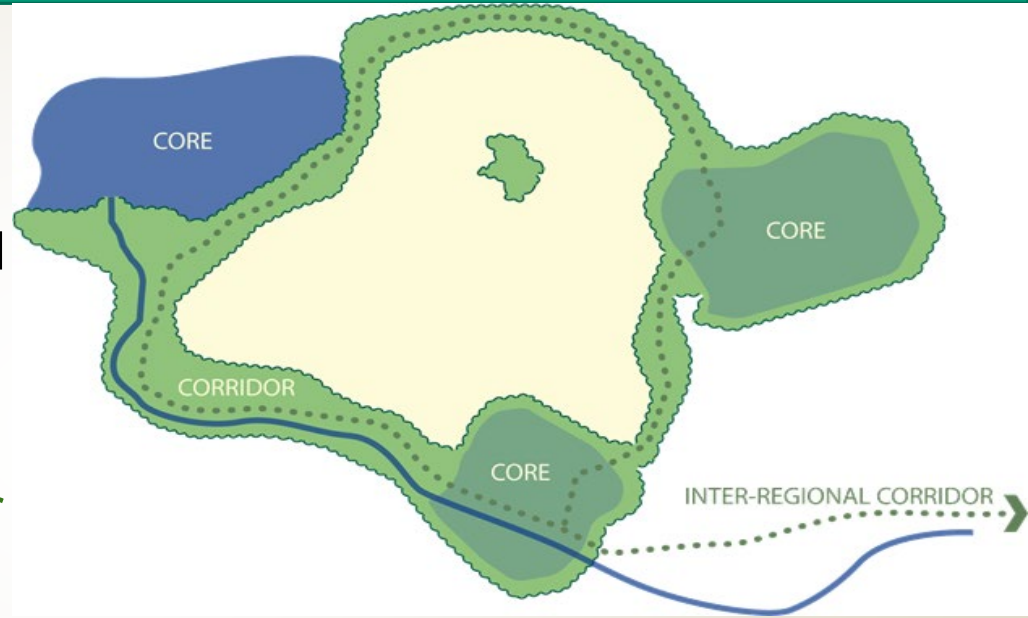Fall 2020 Semester

UNIVERSITY *of* **VIRGINIA**

SCHOOL OF ARCHITECTURE

Thanks to our current funders and partners!

What is green infrastructure?

"Strategically planned and managed networks of natural lands, working landscapes and other open spaces that conserve ecosystem values and functions and provide associated benefits to human populations"

Six Steps for Green Infrastructure Planning

1) **Set Your Goals** – What does your community/organization value?

2) **Review Data** – What do we know or need to know, to map identified values?

3) **Map Your Community's Ecological and Cultural Assets** – Based on the goals established in Step One and data from Step Two.

4) **Risk Assessment** – What assets are most at risk and what could be lost if no action is taken?

5) **Rank Your Assets and Determine Opportunities** – Based on assets and risks identified, what actions are needed?

6) **Implement Opportunities** – Include natural asset maps in both daily and long-range planning (park planning, comp plans, zoning, tourism and economic development etc)

Key Focus Areas

- ## Water
  (Xiyu Liu & Zhiliang Wang)

- ## Forests
  (Shiyao Liu & Zhuoran Yang)

- ## Recreation & Culture
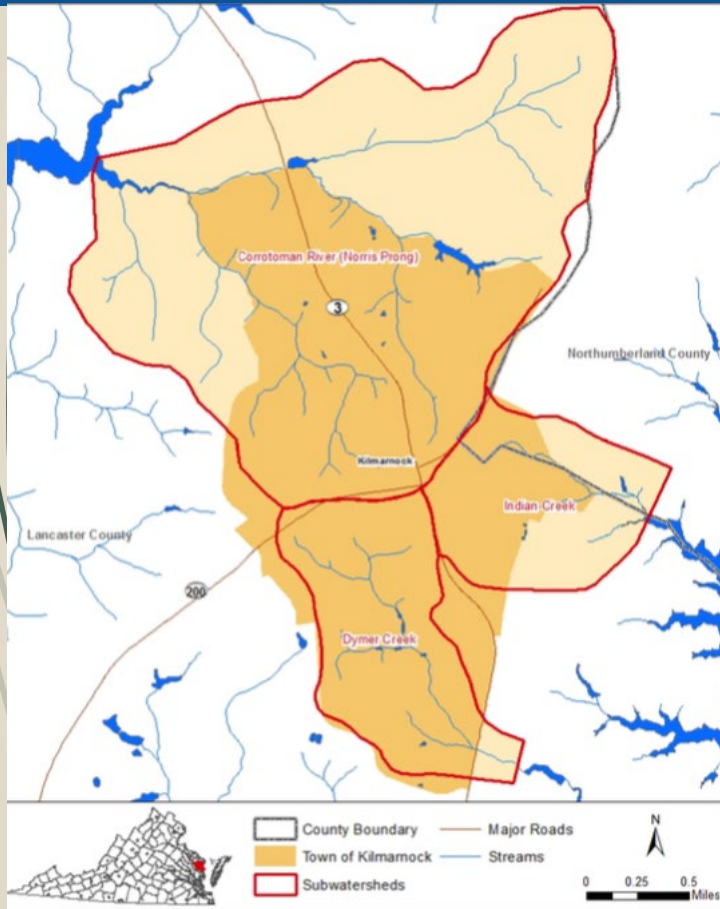 (Pin Hui Wang & Jiajing Lyu)

Xiyu Liu, Zhiliang Wang

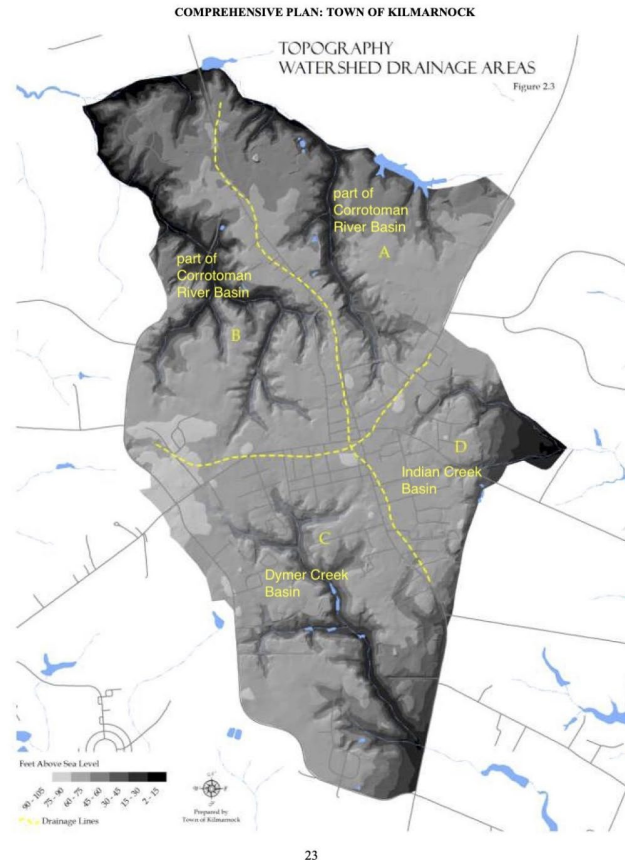Figure 1. Study areas subwatersheds and Kilmarnock town limits

Figure 2. Topography Watershed Drainage Areas

Kilmarnock was built before stormwater runoff requirements and so many areas have no stormwater management facilities or best management practices.
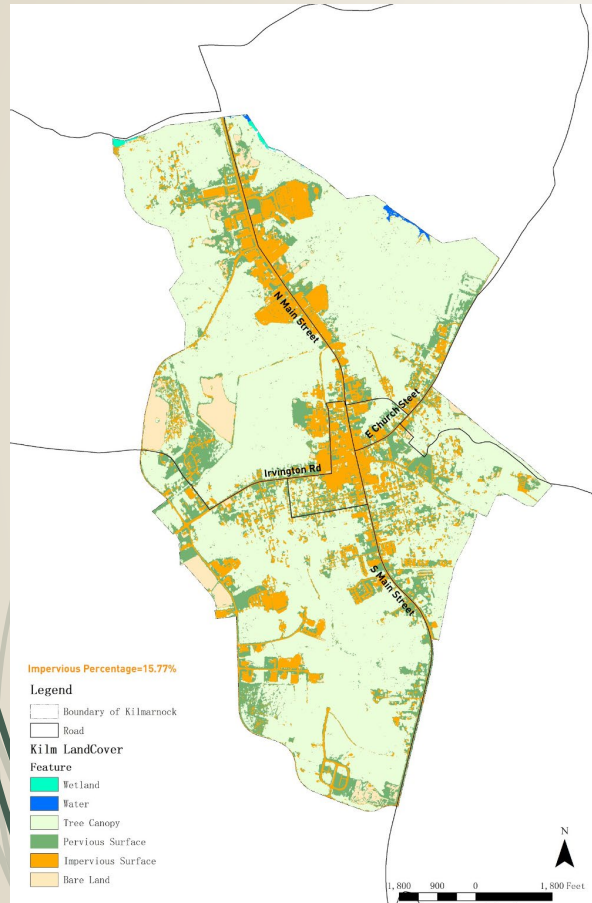
Figure 3. Impervious surface of Kilmarnock

CHALLENGES

Kilmarnock was built at a time when there were no stormwater management requirements. There are so many runoff problems in terms of impervious surfaces, water basins and flooding.

Impervious Surfaces
Kilmarnock has lots of impervious surfaces, producing a large amount of runoff on rainy days. Like paved sidewalks, lots of unused parking lots, plazas. The large volume of stormwater cannot run into the waterways quickly. It is blocked and accumulated on the urban surface as eventually flooding. On the other hand, it is not clean water and would damage the ground vegetations.

Water Basins
The town s stormwater basin needs redesigns and retrofits. Every few years it is overflowing and water comes onto the road. They also have standing water issues where water will not drain away quickly. Which tend to produce higher concentrations of polluted stormwater runoff and/ or have a higher risk for spills.

Flooding in Main Street
because the downtown area of Main Street has no topographic relief, once every 2-3 years, the water will come into the store fronts due to the weak drainage system, so all shops need flood insurance.

OPPORTUNITIES

Many spaces in Kilmarnock have the potentials to be ecological and social. Some of it could even to be reconstructed and make it to be benefit for landscape experience and educational contents.

Transforming the impervious surfaces into permeable surfaces that can bring ecological and social benefits. Like permeable pavements, parks, watergardens. The water could also be collected by water tanks, reducing the surface runoff, so that it can be purified and reused for irrigation.

The Main Street should be carefully concerned, since it is the central commercial area of the town, to ensure the safety of properties and people and the good operation of the commercial function. LID can be introduced to quickly drain the stormwater. Also, this can improve the landscape experience and educational contents for visitors.

Reduce street flooding and improve stream health with Low Impact Development.

Large areas of impervious surface along the Main St

Quick stormwater runoff in a normal rainy day

Existing permeable parking lots in the Central Park

This is a good way of developing water management without expensive construction of new stormwater facilities since LID entails smaller scale opportunities for infiltration. They are appropriate for Kilmarnock which doesn't have stormwater management -- especially along Main St where flooding happens.

Water | Goal One - Objective One

Redesign the stormwater basin to increase the water storage and also reduce water pollution.

Existing stormwater basin

CVS wet pond

There are many stormwater basins in the town, but some of them have issues with water pollution and overflowing. The town needs to redesign them to expand capacity. The stormwater basin re-design also provides the opportunity for increasing the habitats for sensitive and threatened species.
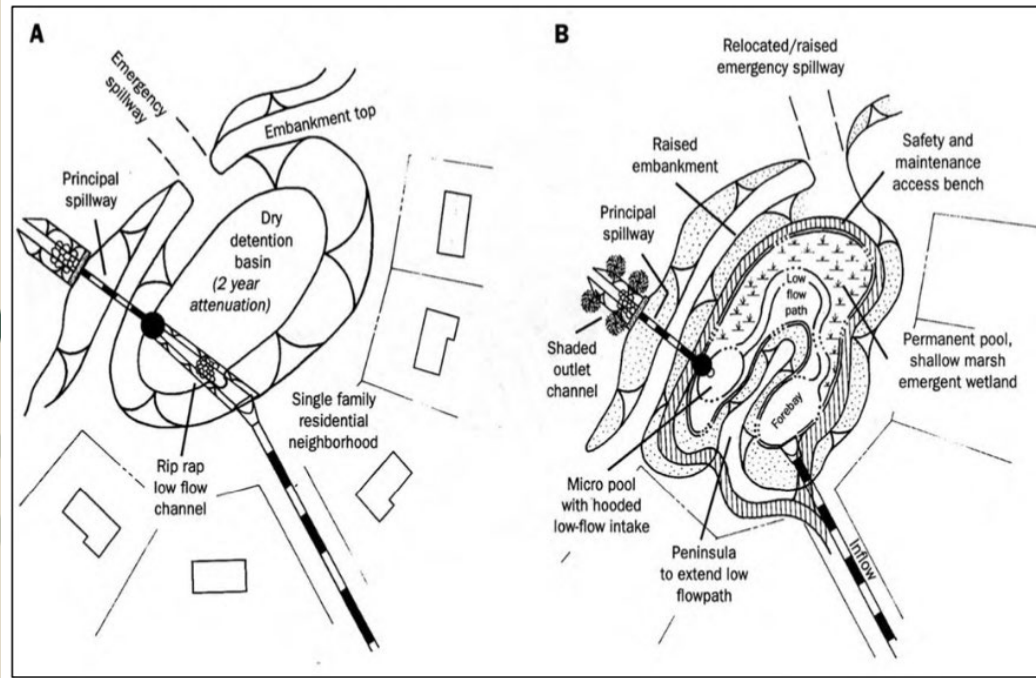

Walgreens Detention Pond

Holiday Inn Express - back pond

Pre-treatment forebay cell

Action 1: Redesign the stormwater basin to expand capacity for higher and more frequent storm events.

1. Calculate the runoff volume as the designed volume for the stormwater basin.

1. To improve the pollutant removal capacity, install pre-treatment forebay cells.

Native Plant Guide for Stormwater Management Areas in the Mid-Atlantic, USA Trees and Shrubs

Tree/Shrub	*Zone	Form	Available	Inundation Tolerance	Wildlife Value	Notes
American Beech (Fagus grandifolia)	5,6	Dec. Tree	no	no	High, mammals and birds.	Prefers shade and rich, well-drained soils.
American Holly (Ilex opaca)	5,6	Dec. Tree	yes	some	High, songbirds, food, cover, nesting.	Coastal plain only. Prefers shade and rich soils.
American Hornbeam (Carpinus caroliniana)	4,5	Dec. Tree	yes	yes	Moderate, food, browsing.	Most common in flood plains and bottom land of Piedmont and mountains.
Arrowwood Viburnum (Viburnum dentatum)	2,3,4	Dec. Shrub	yes	no	High, songbirds and mammals.	Grows best in sun to partial shade.
Bald Cypress (Taxodium distichum)	3,4	Dec. Tree	yes	yes	Little food value but good perching site for waterfowl.	Forested Coastal Plain wetlands. North of normal range. Tolerates drought.
Bayberry (Myrica pensylvanica)	4,5,6	Dec. Shrub	yes	no	High, nesting, food cover. Berries last into winter.	Coastal Plain only. Roots fix N. Tolerates slightly acidic soil.
Bitternut Hickory (Carya cordiformis)	3,4,5	Dec. Tree	no	yes	High, food.	Moist soils or wet bottom land areas.
Black Cherry (Prunus serotina)	5,6	Dec. Tree	yes	yes	High, fruit is eaten by many birds.	Temporarily flooded forested areas. Possible fungus infestation.
Black Walnut (Juglans nigra)	5,6	Dec. Tree	yes	yes	High, food.	Temporarily flooded wetlands along flood plains. Well drained, rich soils.
Blackgum or Sourgum (Nyssa sylvatica)	4,5,6	Dec. Tree	yes	yes	High, songbirds, egrets, herons, raccoons, owls.	Can be difficult to transplant. Prefers sun to partial shade.
Black Willow (Salix nigra)	3,4,5	Dec. Tree	yes	yes	High, browsing and cavity nesters.	Rapid growth, stabilizes stream banks. Full sun.
Buttonbush (Cephalanthus occidentalis)	2,3,4,5	Dec. Shrub	yes	yes	High, ducks and shorebirds. Seeds, nectar and nesting.	Full sun to partial shade. Will grow in dry areas.
Chestnut Oak (Quercus prinus)	5,6	Dec. Tree	no	no	High. Cover, browse and food.	Gypsy moth target. Dry soils.

Native plants for stormwater management areas

Action 2: Choose native vegetation for water purification and habitat restoration from the Virginia Stormwater Management Handbook.

Proposed stormwater basin with landscape and ecological function

1. To reduce the water pollution, replace the turf with bioretention-friendly plants that can survive in both wet and dry conditions or, do a complete retrofit of the basin.
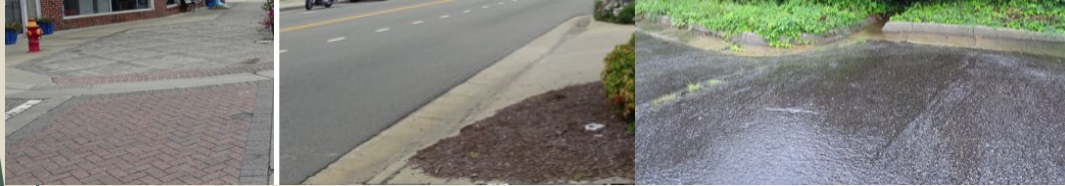
2. think of the basin as a biological community which can attract species and develop into a complete habitat.

Water | Goal One Objective Two

Increase the surface permeability to reduce the pressure of the drainage system and prevent soil erosion.

impermeable swale

The town as far has few points doing the similar strategies, for example, there is a parking area near the park with permeable pavement, which is worthy to be proposed across the town.

Large area of impermeable surfaces

Existing permeable parking lots for use in other parts of the town

Existing rain garden in the Central Park

Action 1: Construct vegetated swales at the edges of paved areas to slow down water runoff and improve water quality.

1. Choose the location which would have large runoff during the rainy days. The vegetated swale should be located at the edges of the paved areas, in Kilmarnock.
2. Choose the plant species which are water tolerant.
3. This could be beneficial to combine the vegetated swale with landscape design for public use.

Existing swale

People's interaction with the proposed swale

Action 2: Use the permeable materials in certain urban impervious surfaces to reduce runoff volume, and promote distributed infiltration.

1. Choose the site which would be applied to and decide the materials for the site.
2. The town should negotiate with the owners and might give some financial support to them for the constructions.

Large area of impermeable surfaces

Permeable materials for ground surfaces

Block paver

permeable asphalt

Action 3: Build rain gardens at the low points of the paved areas to separately intercept runoff and enhance aesthetic value of site.

1. The site could be the town-owned parking lot islands, edges of paved areas, adjacent to buildings, open space, median strips, swales.
2. Construct with a specialized soil mixture, an aggregate base, an underdrain, and site-appropriate plants.
3. The plant materials should tolerate both moist and dry conditions.

before

after

Rain garden

Conserve water and reduce runoff by using water tanks to collect roof water for irrigation.

Cistern

Rational:

Rainwater harvesting is one strategy in the greater scheme of reducing domestic water use. By harvesting rainwater we can utilize rainwater falling onto our homes and landscapes for beneficial purposes, while preventing it from becoming stormwater pollution as it runs off into the drainage. In Kilmarnock, those fresh water we collect could be used for parking detainment, household water and greenland irrigation. Rainwater harvesting inspires other practices that bring us into greater sustainability. Growing plants that provide summer shade to cool our homes reduces energy use.

Water | Goal Two - Objectives 1

Harvest local water from stormwater basins adjacent to the community park and use this non-potable water for irrigation, replacing municipal potable water.

Action 1: Tap into an existing stormwater pond for irrigation, to divert stormwater and dry weather flows from the storm pond into an adjacent storage tank. From the tank, urban runoff can be delivered to the park's existing irrigation system.

Bioswale around Park

Action 2: Create a stormwater harvesting and irrigation use pilot project to demonstrate water efficiency and savings over spray irrigation by installing a sub-surface irrigation system under a small test turf patch.
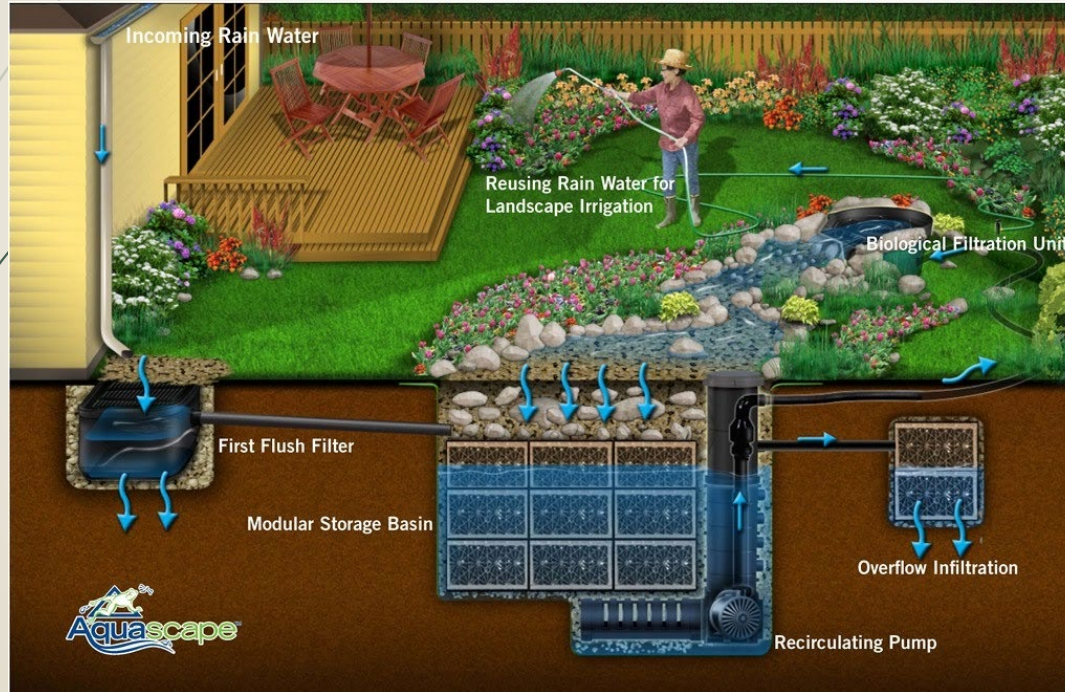

Town Centre Park

Irrigation Proposal
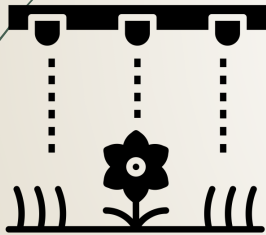
Water | Goal Two - Objective 2

Encourage the harvesting of stored rainwater around residential areas as an extra water resource for domestic outdoor uses on the town's website.

Rational:

Outdoor uses include irrigation, water features, sanitary sewer flushing, street cleaning/dust control, vehicle/building washing, firefighting, recharge, and ornamental and recreational wetlands. Plumbing codes and requirements for outdoor systems may be less restrictive than those for indoor use.
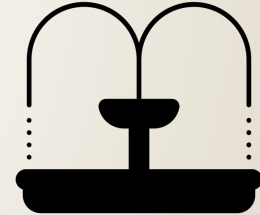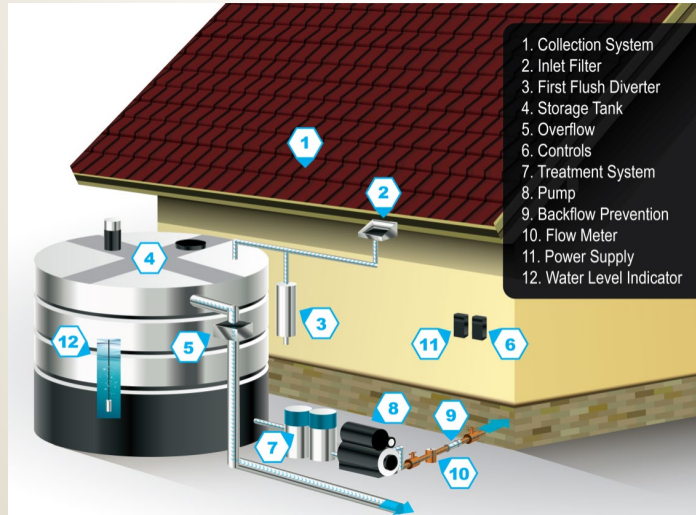
Irrigation

Carwash

Firefighting

Water features

Action 1: The roof rainwater catchment system should be demonstrated at several locations.

1. **Gutters**: Roof water gathers in the gutters and runs to a pipe towards the tank.

2. **First Flush**": The first rain of the year is the dirtiest as it cleans the roof. This water is directed away from the tank in a "first flush system" and the subsequent water continues to the tank.
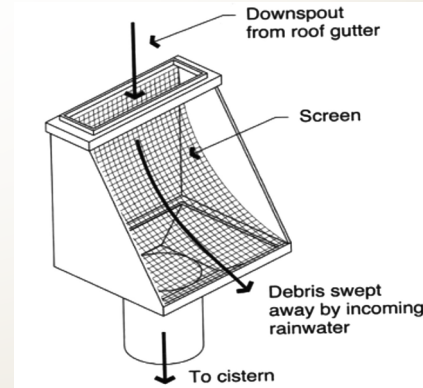

1. Collection System
2. Inlet Filter
3. First Flush Diverter
4. Storage Tank
5. Overflow
6. Controls
7. Treatment System
8. Pump
9. Backflow Prevention
10. Flow Meter
11. Power Supply
12. Water Level Indicator

3. **Screen**: The rainwater goes through a screen to remove leaves and debris, and then funnels into the top of the covered tank.

4. **Storage**: The tank is dark, to prevent algae from growing, and screened, to prevent mosquitoes from entering

200 gallons of storage tucked next to a garage

Roof water collecting detail

Action 2: Irrigation system (A hose attachment is located near the bottom for irrigation. Larger systems can include gravity drip irrigation, or a pump for drip irrigation)

Irrigation

Action 3: Vehicle/building washing (Demand for outdoor washing may be seasonal in cold climates. Water harvested for washing may require disinfection due to risk of exposure)

Vehicle Washing

Action 4: Community firefighting (Considerations for fire suppression sprinkler systems are similar to those for firefighting)
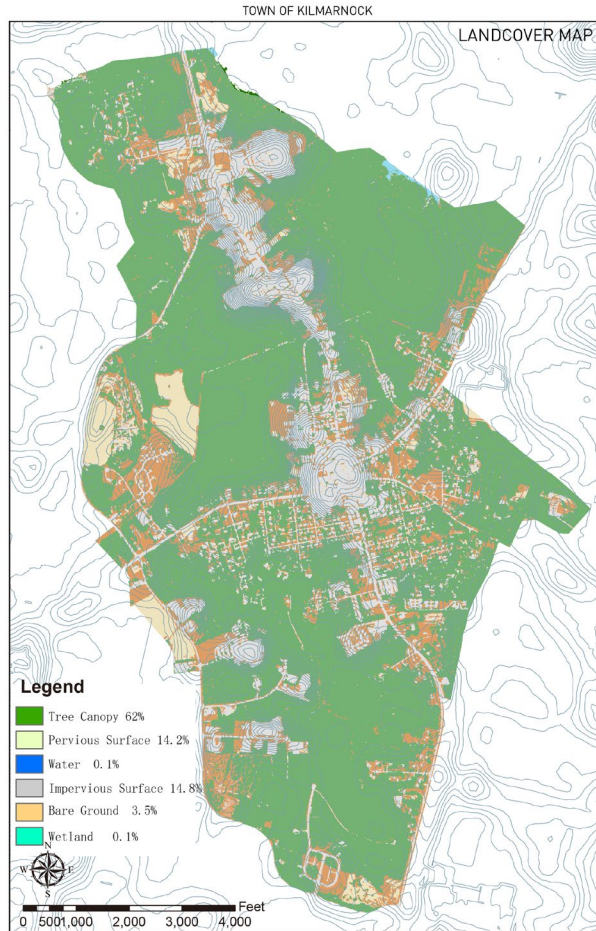

Firefighting

Urban Forest Overview

Urban forests are dynamic ecosystems that provide **critical benefits** to people and wildlife

❖ Shading streets and promoting walkability

❖ Cleaning the air by removing fine particulate matter

❖ Providing habitat, food and protection to plants and animals and increasing urban biodiversity

❖ Addressing the runoff issues
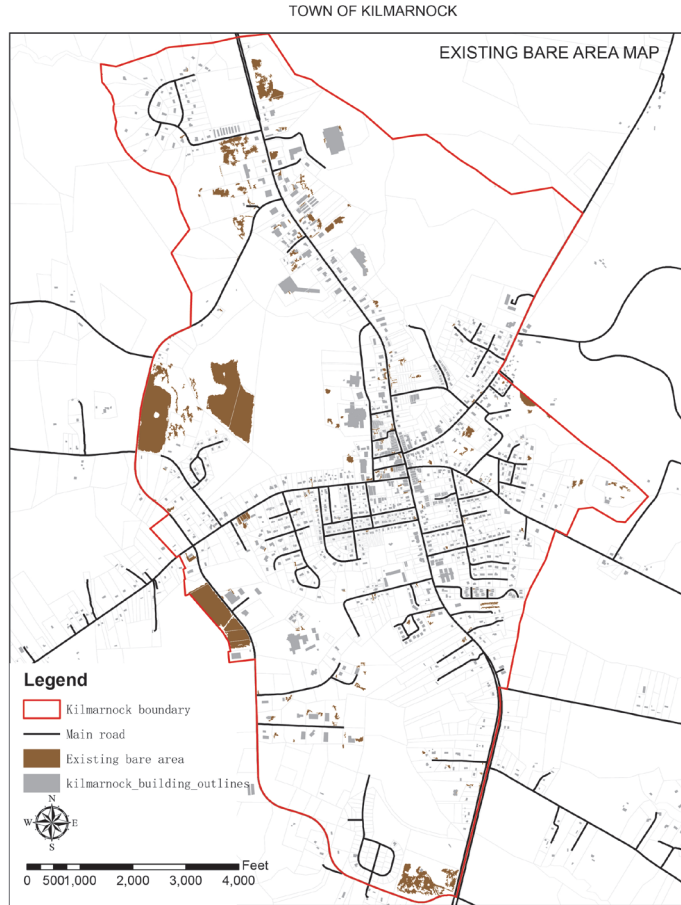
Urban Forest Overview

Urban forests come in many different shapes and sizes like landscaped boulevards, gardens, river and coastal promenades, greenways, river corridors, forested wetlands, etc. They are dynamic ecosystems that provide critical benefits to people and wildlife.

From the landcover analysis, the canopy inside and outside Kilmarnock has a sharp contrast. The surrounding area is covered by forests and farmlands while Inside the town there is harder pavement without continuous canopy.

The coverage rate of canopy is as high as 62%, but most of the canopy is located around the town rather than in densely populated areas.

Urban Forest Overview

TOWN OF KILMARNOCK

EXISTING BARE AREA MAP

Legend
- Kilmarnock boundary
- Main road
- Existing bare area
- kilmarnock_building_outlines

Feet
0 500 1,000 2,000 3,000 4,000

According to the Comprehensive Plan, there is about 40% vacant developed area in Kilmarnock (13 percent is essentially undevelopable due to the soil condition.)

There are many bare areas (about 3.5%) in Kilmarnock.

It is feasible and necessary to plant more trees in Kilmarnock.

Issues:
- ❖ Some trees are in bad condition due to the lack of tree management or wrong tree species selection
- ❖ Lack of landscape which diminishes the attractiveness of the town
- ❖ Low canopy continuity which decreases the walkability

Opportunities:
- ❖ Many bare parcels in Kilmarnock have the potential to be used for green infrastructure

Increase the tree canopy of Kilmarnock to improve walkability and provide habitat for birds and other native wildlife

Why planting **MORE** trees is important?

❖ AIR: Trees clean particulate matter and volatile organic chemicals (VOCs) from the air.

Pollution removal by urban trees in the United States has been estimated at 711,000 tons per year (Nowak et al. 2006a).

❖ WATER: Trees capture rainwater and reduce the risk of natural disasters like floods and landslide

A mature evergreen tree can intercept more than 15,000 liters of water every year. (UN Food and Agriculture Association).

Increase the tree canopy of Kilmarnock to improve walkability and provide habitat for birds and other native wildlife

Why planting **MORE** trees is important?

❖ BIODIVERSITY: Trees provide habitat, food and protection to wildlife

A single tree can be home to hundreds of species of insect, fungi, moss, mammals, and plants.

❖ CLIMATE: Trees reduce impacts from urban heat island effects

A mature tree can absorb an average of 48 lbs. of carbon dioxide per year

Trees provide habitat, food and protection to plants and animals, **increasing urban biodiversity.**

Strategic placement of trees in urban areas can **cool the air** by between 2 °C and 8 °C.

Increase the tree canopy of Kilmarnock to improve walkability and provide habitat for birds and other native wildlife

Why planting **MORE** trees is important?
❖ ECONOMY: Reduce the cost of energy and maintenance.

Cut air conditioning use by 30% and reduce the heating use by 20-50%, which brings great economic benefits.

20% shade on a street improves pavement condition by 11%, which is a 60% savings for resurfacing over 30 years.

Increase the tree canopy of Kilmarnock to improve walkability and provide habitat for birds and other native wildlife

Why planting **MORE** trees is important?
❖ HEALTH: Trees benefit human society like the physical and psychological health of people

Trees help reduce stress and anxiety and allow us to reconnect with nature.
↳ Residents of areas with the highest levels of greenery were three times as likely to be physically active and 40% less likely to be overweight or obese than residents living in the least green settings.

 In addition, shade provided by tree coverage helps protect our skin from the ever-increasing harshness of the sun by providing shade, providing pleasant views and reducing environmental stressors.

Outcomes

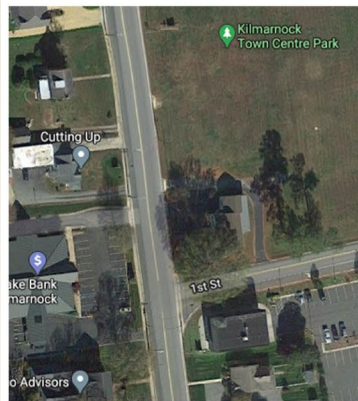Many important streets lack tree canopy (less than 20%)
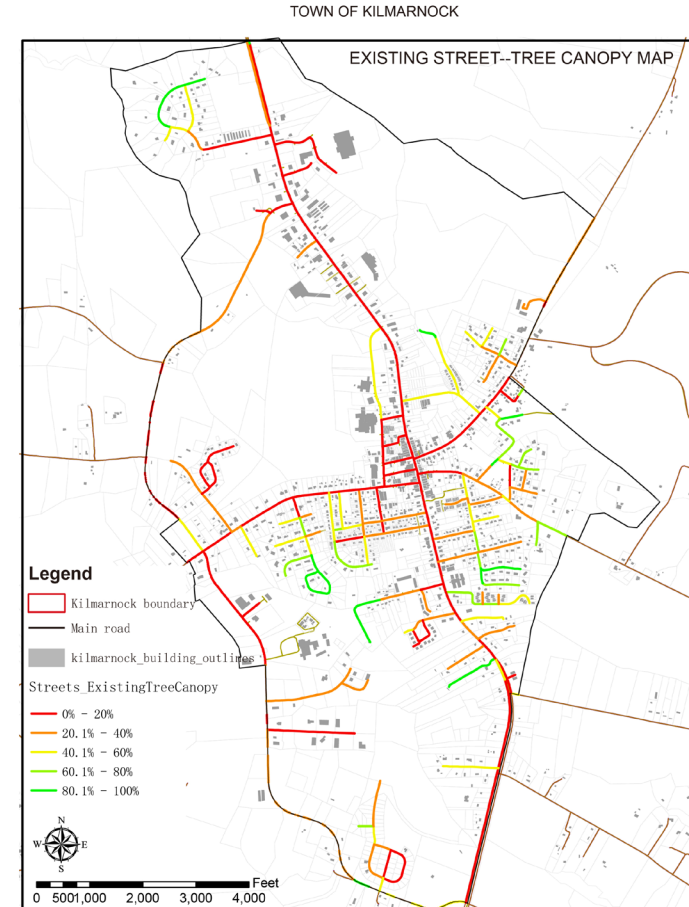
Outcomes

We recommend to give planting priority to the Main Street (especially the connection between the central park, Kilmarnock museum and library); the School Street that connects several educational institutions; Part of Irvington Streets

TOWN OF KILMARNOCK

PLANTING PRIORITY AREA

Outcomes

❖ Main Street

Before
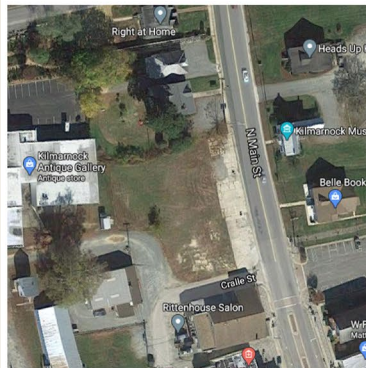

After

Outcomes

❖ Main Street

Before

After

❖ Main Street

Before

After

Outcomes

❖ School Street

Before

After
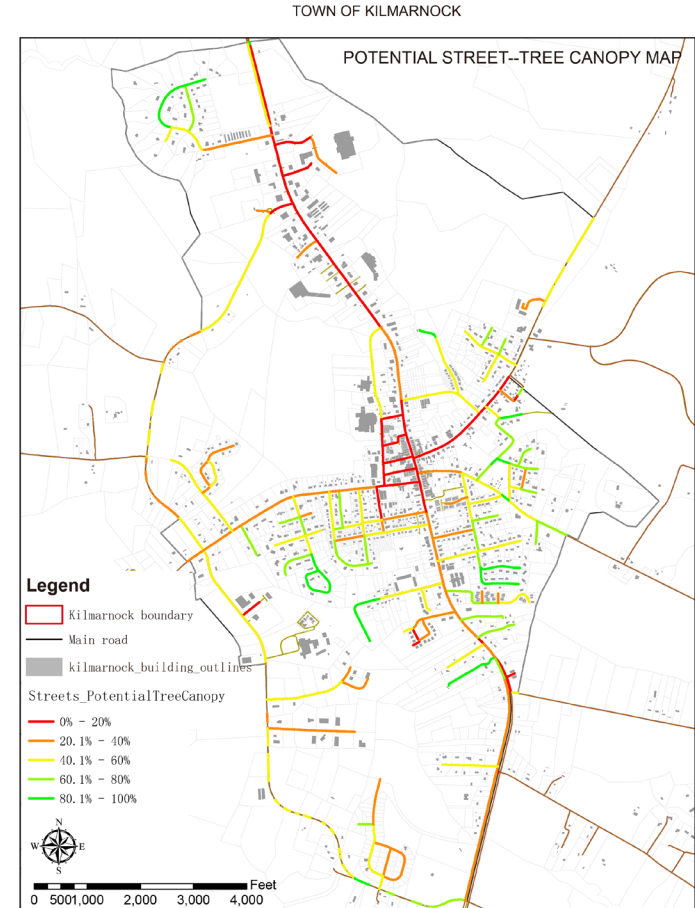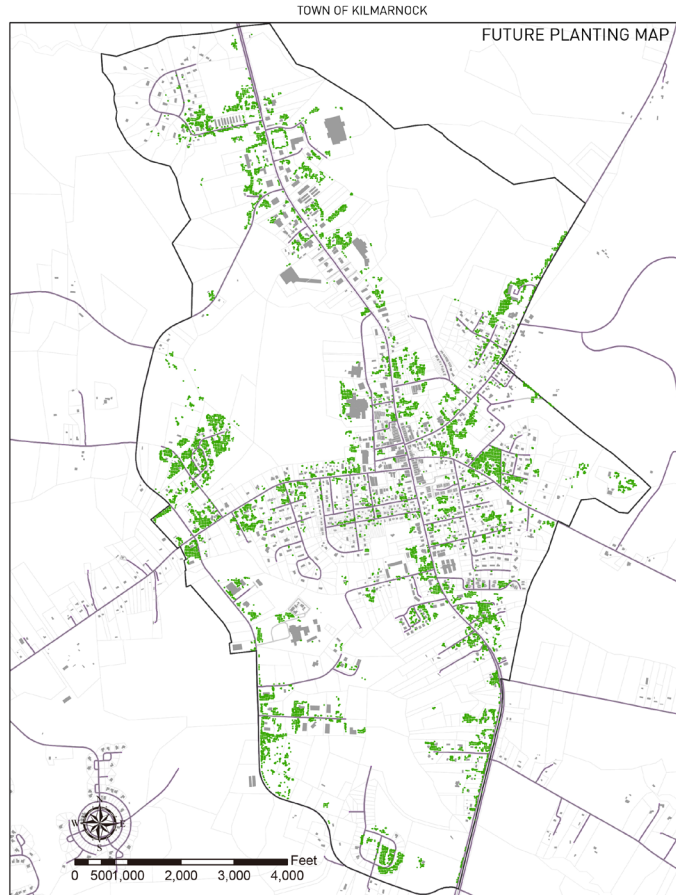
Outcomes

❖ We recommend the cooperation of government, individuals and community to build better green streets in the future.

TOWN OF KILMARNOCK
FUTURE PLANTING MAP

TOWN OF KILMARNOCK
POTENTIAL STREET--TREE CANOPY MAP

Legend
☐ Kilmarnock boundary
— Main road
▨ kilmarnock_building_outlines
Streets_PotentialTreeCanopy
— 0% - 20%
— 20.1% - 40%
— 40.1% - 60%
— 60.1% - 80%
— 80.1% - 100%

Adopt proposed street tree species

Why choosing right street tree species is important?

❖ Right tree species can have a longer lifespan such as surviving in the rainstorm

❖ Right tree species won't make street messy and drop limbs easily

TREE SPECIES		Type	Form	Mature Size(WxH)	Growth Rate
Scientific Name	Common Name				
Betula nigra	River Birch	Deciduous canopy tree	pyramidal	50x60	Fast
Carpinus caroliniana	American Hornbeam	Deciduous canopy tree	rounded	30x30	Slow
Carya spp	Hickory species	Deciduous canopy tree	Oval, Round, Upright		Slow
Cladastrus kentukea	American yellowwood	Deciduous medium tree	rounded	40x30	Medium
Fagus grandifolia	American Beech	Deciduous canopy tree	Pyramidal, Rounded	40x50	Medium
Ostrya virginiana	American hophornbeam	Deciduous canopy tree	Pyramidal, Rounded	30x40	Slow
Quercus alba	White Oak	Deciduous canopy tree	rounded	60x60	Slow
Qrubra	Northern Red Oak	Deciduous canopy tree	rounded	60x50	Fast
Qcoccinea	Scarlet Oak	Deciduous canopy tree	rounded	60x45	Medium
Qphellos	Willow Oak	Deciduous canopy tree	rounded	60x40	Fast
Ginkgo biloba	Maidenhair tree Male cultivars only	Deciduous canopy tree	upright	50x50	Slow
Platanus × acerifolia	london planetree	Deciduous canopy tree	Broad, Pyramidal	70x70	Fast
Tilia americana	American Linden	Deciduous canopy tree	rounded	50x35	Medium
Amelanchier arborea	Downy Serviceberry	Deciduous	Narrow		Medium
Amelanchier x grandiflora	Hybrid Serviceberry	Deciduous	rounded		Medium
Cercis canadensis	Eastern Redbud	Deciduous	Irregular,rounded	35x30	Medium
Cornus florida	Flowering Dogwood	Deciduous	Broad, Rounded	20x40	Slow
Acer pseudoplatanus	Sycamore maple	Deciduous canopy tree	rounded	60x60	Medium
Taxodium distichum	bald cypress	Deciduous canopy tree	pyramidal	60x25	Fast
Gleditsia triacanthos	Honey locust	Deciduous canopy tree	irregular	30x35	Fast

Set street tree planting standards

Why setting street tree planting standards is important?

❖ Setting planting standards is an opportunity to explore new ways to meet the goals of canopy growth and environmental equity in Kilmarnock over the long-term in order to make sure the green infrastructure works well in terms of tree canopy

Appendix C: Street Tree Planting Standards

Street Tree Planting Standards

Species Selection

Growing conditions and microclimates can vary from location to location within neighbourhoods and across the city. Species selection should take into account site conditions, design goals, and diversity goals. In choosing a species, the mature height and spread shall be considered to ensure that it will not interfere with existing or proposed structures and overhead utilities. The final selection of the species is made by the Forester. Town will not allow large trees to be planted under primary wires and discourages small trees in large open spaces.

Suggest street trees species list is included as Appendix C

Spacing Requirements

The following requirements shall be followed when sitting tree pits along sidewalks. These guidelines generally follow regulations of other agencies with jurisdiction or infrastructure on the right-of-way. These requirements are design and tree species dependent. The American with Disabilities Act (ADA) guidelines must also be followed.

a. Do not plant in front of building entrances in order to permit easy access by the Fire

Department.

b. Do not plant within bus stops.

c. Do not plant within no standing zones.

d. Do not plant directly over DEP water mains less than 20 inches in diameter. e. Minimum horizontal distance from DEP water main to tree trunk is 6 feet.

f. Minimum distance between trees (trunk to trunk) shall be 20 feet to 30 feet, depending

upon the tree species and other local conditions.

g. Minimum distance from a streetlight or utility pole to the tree trunk is 25 feet (this may vary with tree species).

h. Minimum distance from a stop sign to the tree trunk is 30 feet.

i. Minimum distance from other traffic signs to the tree trunk is 6 feet.

Amend the Town's current tree maintenance plan with its contractors

- ❖ Trees that are well maintained perform better over a longer useful lifespan and provide maximum socio-economic benefits to the community

- ❖ Maintained trees have a lower risk of failure while creating a sense of place and pride within neighborhoods.

- ❖ Ongoing maintenance is essential to the long-term survival of newly planted and mature trees.

Outcomes

Add Ordinance on Tree Removal Permits in Kilmarnock

❖ A tree removal permission can help to preserve more mature trees on private property.

❖ Since Kilmarnock doesn't have a policy towards tree removal permit, we suggest using the Tree Removal Permit Ordinance in the town of Herndon as an example to learn from.

❖ Herndon VA Tree Ordinance, Removal Permit
http://www.treeremovalpermit.com/virginia/herndon-ordinance-permit-arborist/

Funding sources

❖ Virginia Department of Forestry: Provides funds for tree planting and offers technical assistance
    See http://www.dof.virginia.gov/financing/grants.htm

❖ U.S. Forest Service Grants
    See https://www.fs.usda.gov/working-with-us/grants

❖ land and water conservation fund
    See https://www.doi.gov/lwcf

❖ Tree City USA(need to meet 4 standards)
    See https://www.arborday.org/

Recreation And Culture | Overview

Kilmarnock Museum

Kilmarnock Museum

Downtown Streets

Good Luck Cellars

Kilmarnock possesses gorgeous downtown streets, relaxing atmosphere, food and a series of small-scale cultural heritages.

The town has chic boutiques for gifts and as well as gourmet foodie spots along downtown area selling local seafood and unique frozen beer. The small-town atmosphere and friendly merchants there are the essential assets of Kilmarnock.
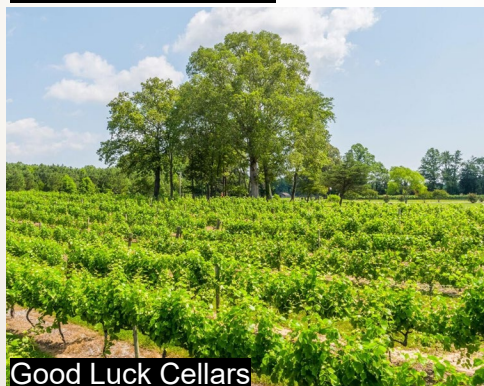
Not only the cultural and historical features in town, but the surrounding vineyards and cellars are parts of the tourism circle that provides visitors both great views and wines.

Issues and Opportunities

CHALLENGES

Tourism is one of the major incomes for the small town. However, most tourists can only arrive the town by car. Try to enhance the existing guidance system to provide tourists more convenient and profound experience of Kilmarnock.
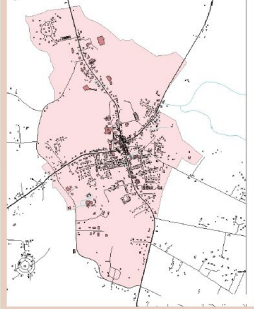
Transportation
The major problem at Kilmarnock is that the town does not have major transportation channels, such as interstate highways, or carriage-based airports. Kilmarnock has the potential to connect with several surrounding towns as a tourism ecosphere for people wanting to have 2-5 day-trips.

Street Sign
There are several street signs which have designed icon already exist in the town. Making full use of this icon in several different areas like brochure, peripheral products, letting the tourists feel familiar with the town.
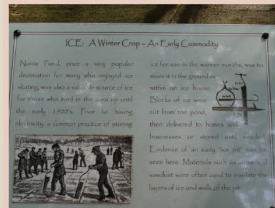
Historical Activities Sign
A small sign at Norris Pond shows the history of ice retrieval by river. More interactive devices related to this history can be set up in this area instead of just signs. Using the interactive way to make people feel interested.

OPPORTUNITIES

Many existing arts sculptures and several festivals activities in Kilmarnock have potentials to provide fruitful cultural events and stories for tourists to know more about this small town.

Arts Sculpture
There are some sculptures which related with the fishing cultrual. However, some of them are not familiar with people even the local people. Creating a tour map of the sculptures and attach detailed descriptions to give visitors a better understanding of the culture towards the sculptures.

City Market
The original purpose of the existing Farm Market was to have a place to bring fresh food from the farm and the bay areas to the community. Based on this background, we can consider selling some products to present the town identity, such as selling local fresh food or related handicrafts with town culture.

KILMARNOCK MARKET
EAT FRESH   BUY LOCAL
farm-to-table & bay-to-table

Activites& Festivals
The music festival is hold from May to October at the Theatre in Central Park. After that, we can not only let local musicians participate in the schedule of the performances, but also hold appropriate community activities to gather locals and tourists, such as art or food exhibitions.

- **Issues**
  - ❏ Aging Population Growth
  - ❏ Lack of Unified and Systematic Signage
  - ❏ Unclear Information and Promotion Method of Public Art Project
  - ❏ Lack of Enough Green Spaces Near Communities

- **Opportunities**
  - ❏ Vacant Parcels Around Communities
  - ❏ Existing Signage At Downtown Street
  - ❏ Existing Organizations and Sponsors for Public Art Project
  - ❏ High Level of Walkability

Enhance the Legibility and Visibility of the Existing Small-town Charm to:

- **Make people more familiar with the town's history and culture**
- **Enhance wayfinding system of Kilmarnock for visitors to visit the town.**

Throughout the history of Kilmarnock as "The Crossroads", the development of the whole town has an indispensable relationship with commerce. Agriculture, forestry and fisheries play important roles in the local economy. Numerous historical buildings and cultural resources throughout this town also become the physical records of past stories. To provide a better understanding and wayfinding of how Kilmarnock was established step by step for both residents and visitors, it is beneficial to establish a guiding sign system to emphasize, reveal, and celebrate the small-town charm and friendly merchants.

A. **Implement a system of guiding signs which combines with the existing sign features for the visitors to experience cultural areas in Kilmarnock**

Action 1: Identify existing historical and cultural areas. Submit to the Virginia Department of Historic Resources(DHR) to have a preliminary evaluation of these resources (*see pictures below*).
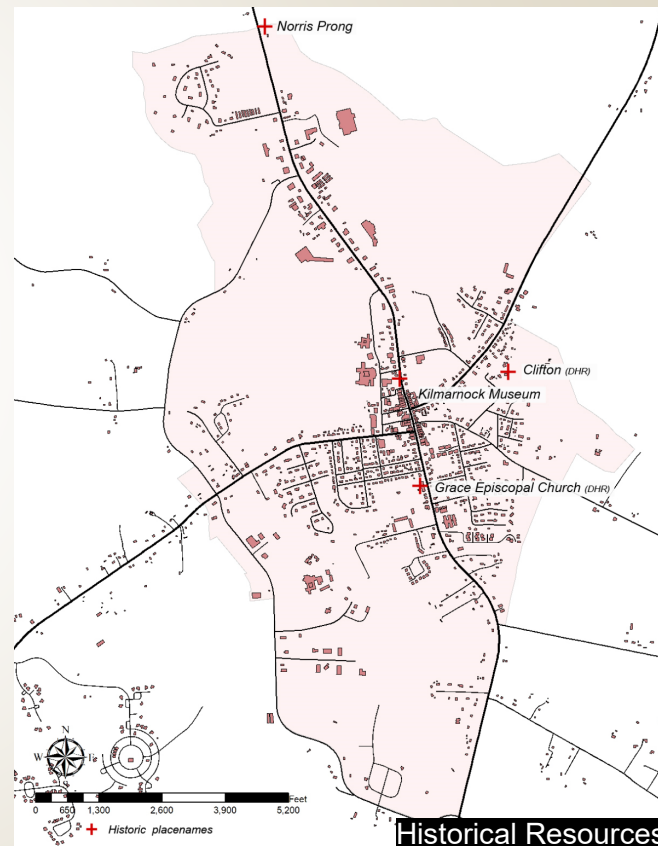
Kilmarnock Museum

Grace Episcopal Church
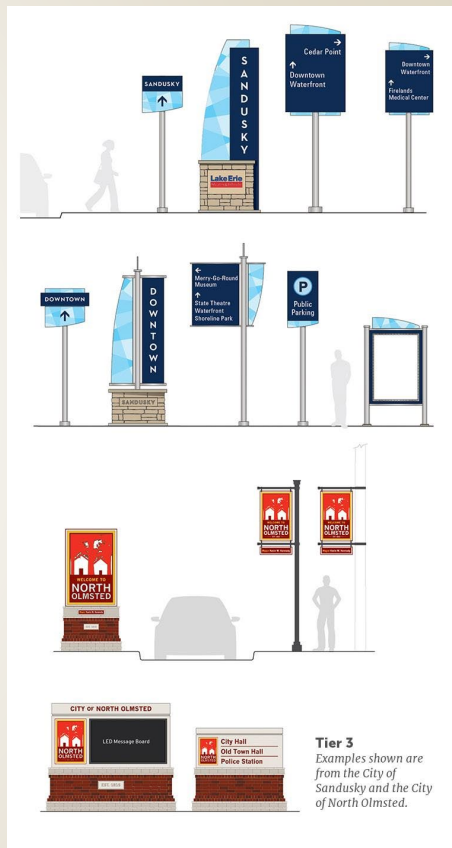
Clifton

Historical Resources

Action 2: Create an interpretative signage system guideline for all the signage in the town with the unified style*. (see ref pictures on the right)*

Action 3: On the main sidewalk, place several signages with a guide map indicating culturally relevant areas for tourists to visit.

Existing signages in town

*Examples of Unified Style Signages*

Action 4: Put welcome sign on the entrance of the historical and cultural related areas (ex: Kilmarnock Museum, Grace Episcopal Church, Norris Pond, Virginia State Route 3 approaching Kilmarnock).

Action 5: Identify local tourist spots on current discovery map (see the map on the right), and set up a wayfinding signage system for visitors to make these places more accessible and easily find their traveling destination.

Ref Example_Welcome Signs from Virginia's Towns
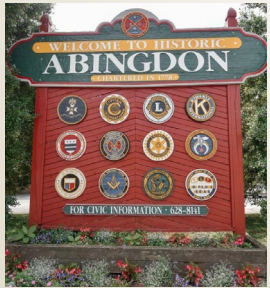
Promote the features of Watermen's Way (public art project) and improve current publicity to the visitors by implementing interactive games and connecting related fishery industries.

Action 1: Identify current sponsors of the project and strengthen the existing collaboration by amplifying the power of respective businesses.

Action 2: Create brochures,posters regarding the origin of fiberglass boots, and then design stamp collection games with "passport" and hint maps and prepare corresponding rewards based on the numbers of stamps collected.

● LOCATION OF FIBERGLASS BOOTS

Appendix F-1 Waterman's Way Map (Kilmarnock)

Art project " Watermen's way"   Sponsor: Lancaster by the Bay Chamber   Location of Fiberglass Boots
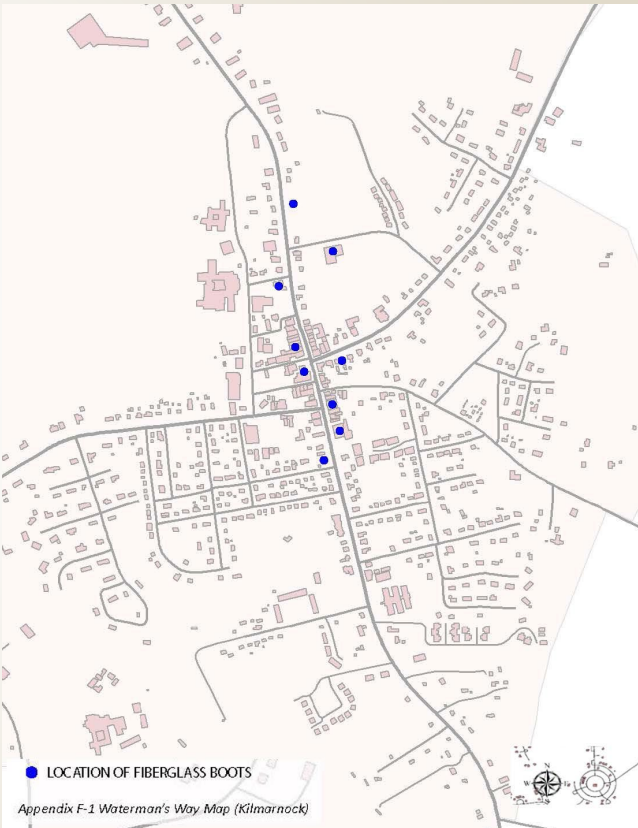
Action 3: Expand the cooperation with local shops,restaurants and hotels by setting up those publicity materials on these spaces, downtown streets and parks where most visitors would visit or stop at.

Action 4: Connect the content of rewards to the products of fishery industries or coupons of sponsoring shops and restaurants to benefit the local economy.

Promotion Publicity Collaborator
Rappahannock Art League

Local Restaurants, Shops, Tourist Spots

Kilmarnock is also a town which attracts more and more retirees to move in. According to the U.S. Census Bureau from 2007- 2011, the **average median age** of Kilmarnock's population is **54**. The **age over 60** has already reached **41 %**.

Nearby nature experiences are important across the entire life cycle, from cradle to grave.
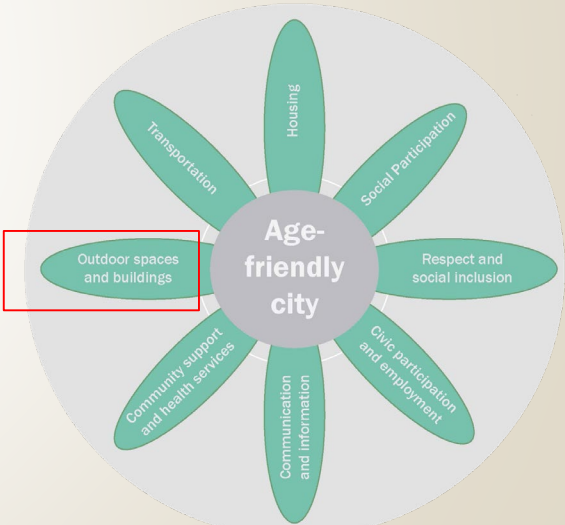
POTENTIAL ECONOMIC VALUE:

$1.7–$2.4B SAVINGS ON HEALTH CARE COSTS FROM FALLS PER YEAR.

KATHLEEN L. WOLF, PH.D., Nature's Riches: The Health and Financial Benefits of Nearby Nature

Elder people on the street

**Age-friendly city elements
Credit: World health organization,2007**

A. *Improve the accessibility of the surrounding public space to local residents by adding the pocket parks. Create a series of ¼ acre parks nearby communities.*

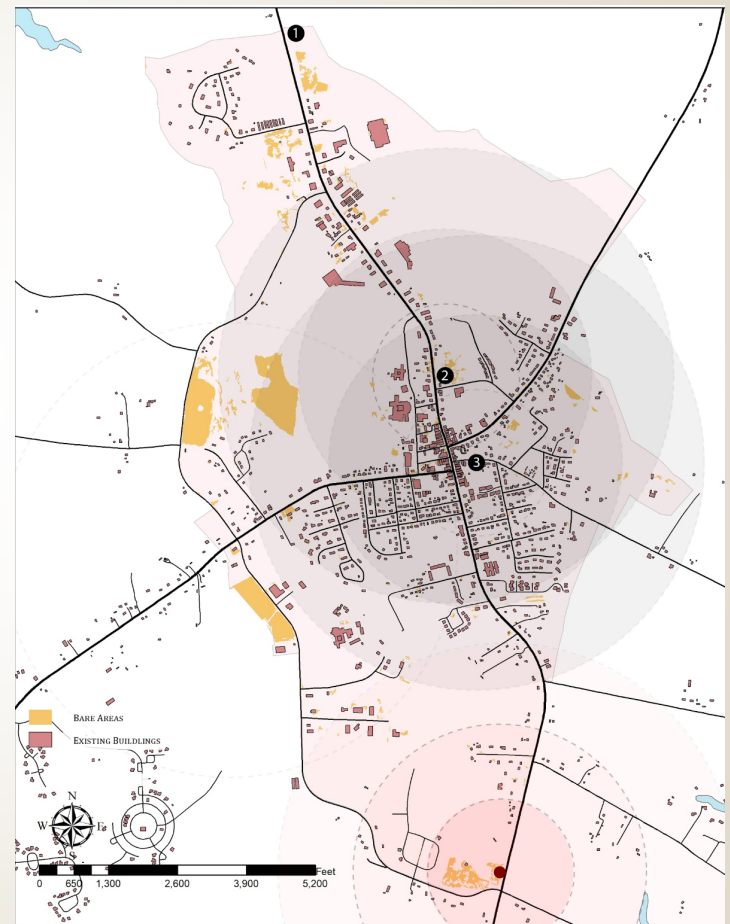*Action 1:* Propose vacant areas which could be converted to the pocket park

EXISTING PARK SERVICE AREAS

POSSIBLE AREAS CONVERTED TO THE POCKET PARK

ONLY ARRIVED BY CAR

5 MINS   10 MINS   20 MINS

1 BAYLOR PARK NATURE TRAIL

2 KILMARNOCK TOWN CENTRE PARK

3 JOE CURRY MEMORIAL PARK

N
W   E
S

0   650   1,300   2,600   3,900   5,200
Feet

BARE AREAS

EXISTING BUILDINGS

N
W   E
S

0   650   1,300   2,600   3,900   5,200
Feet

A. *Improve the accessibility of the surrounding public space to local residents by adding the pocket parks. Create a series of ¼ acre parks nearby communities.*

Action 1: Propose vacant areas which could be transferred to the pocket park

Action 2: Follow design guidelines and standards for pocket parks, recreation areas, programs and green coverage, etc.

- Control
- Choice
- Safety and security
- Accessibility
- Social support
- Physical Activity
- Privacy
- Contact with nature
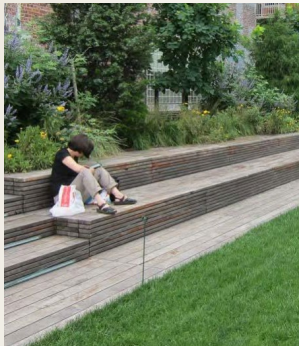- Comfort
- Aesthetic and sensory delight

Control

Orientation
Legibility
Way-finding

Different activity spaces

Safety and security

Accessibility

Access park quickly

Social support

Little free library
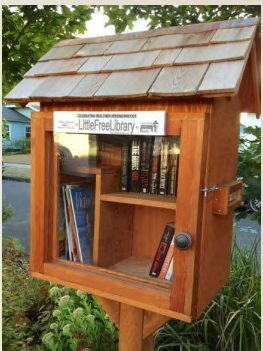
Physical Activity

Privacy

Contact within nature

Douglas park, Los Angeles

Comfort

Psychological comfort

Aesthetic and sensory delight

THE DEMONSTRATION SITES FOR POCKET PARKS.
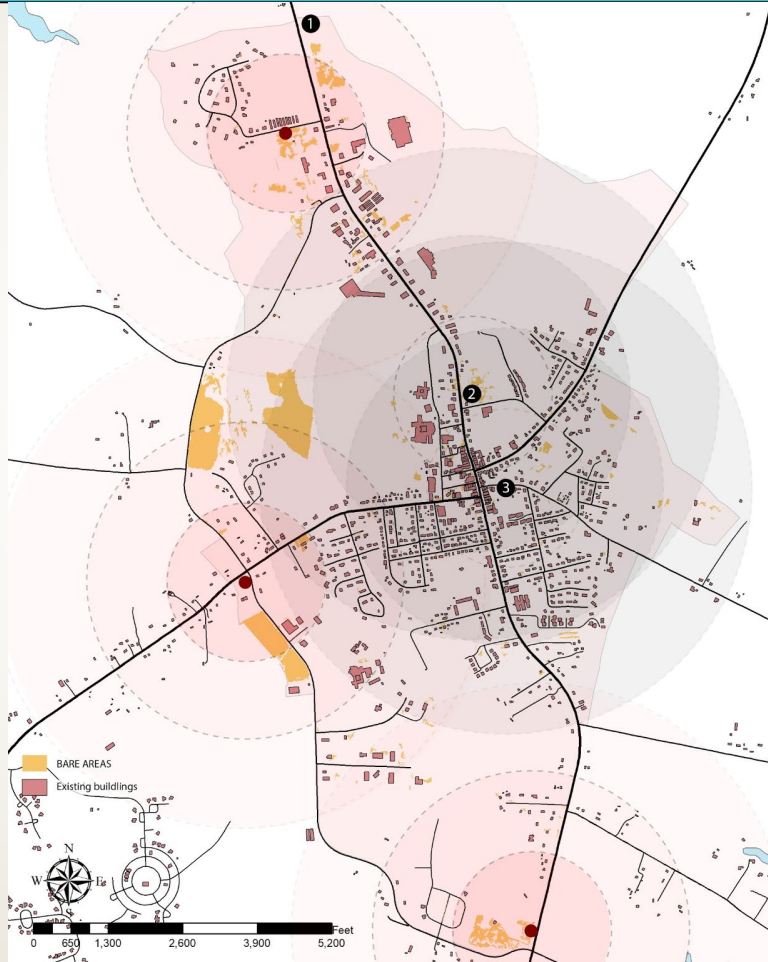
A. *Improve the accessibility of the surrounding public space to local residents by adding the pocket parks. Create a series of ¼ acre parks nearby communities.*

Action 1: Propose vacant areas which could be transferred to the pocket park

Action 2: Put forward design guidelines and standards for pocket parks, recreation areas, programs and green coverage, etc.

Action 3: Select one or two areas as the demonstration sites for pocket parks.

Action 4: Establish a Park Stewards Group to help with parks care and management such as the tending of a garden bed, invasive species removal and trash pickup

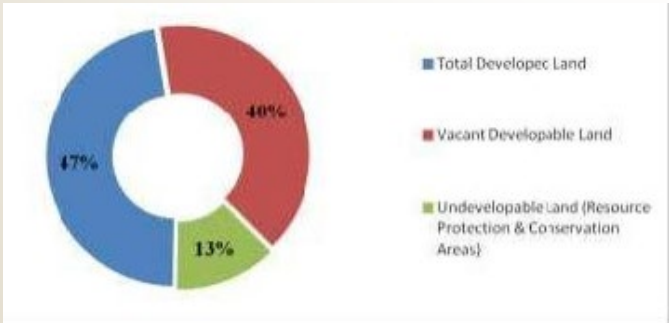Planting new tree   Removing invasive species   Picking up trash   Tending of garden bed

Propose a corridor design guideline which helps preserve the existing corridor style in the future development of the town. Enhance the tourists walking experience.

The purpose of entrance corridor design guidelines is to provide a tool for property owners, developers, designers to create, review and build quality new buildings or renovate existing structures along town's major entrance corridors. Many town corridors lack a clear beginning and end which makes drivers unclear whether they actually arrived in the towns or not. The appearance of the buildings or street view are chaotic due to lack of corridor design guidelines.

Existing entrance corridor condition

- ■ Total Developec Land
- ■ Vacant Developable Land
- ■ Undevelopable Land (Resource Protection & Conservation Areas)

40%
47%
13%

Developed and Available Land Kilmarnock ; COMPREHENSIVE PLAN: TOWN OF KILMARNOCK

Put forward entrance corridor design guidelines.

Action 1: Put forward design principles.

Action 2: Update planting design standards (See Forestry section).

Action 3: Update recreation, amenity and open space design standards.

Action 4: Update street/ pedestrian/ trail design standards.

Funding Resource

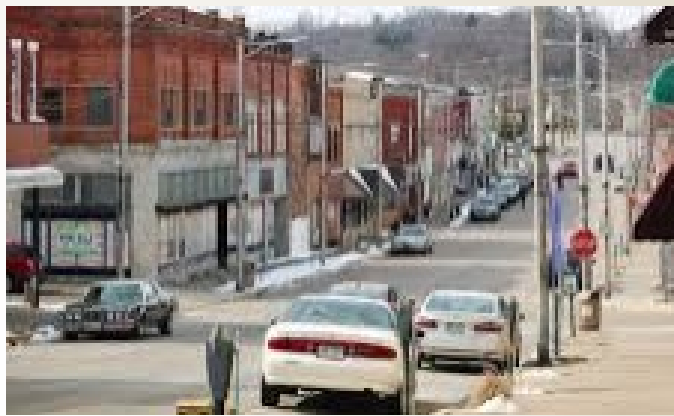The Town has Entrance Corridor Design Guideline

The Entrance of Charlottesville

The downtown of Charlottesville

The Town doesn't has Entrance Corridor Design Guideline
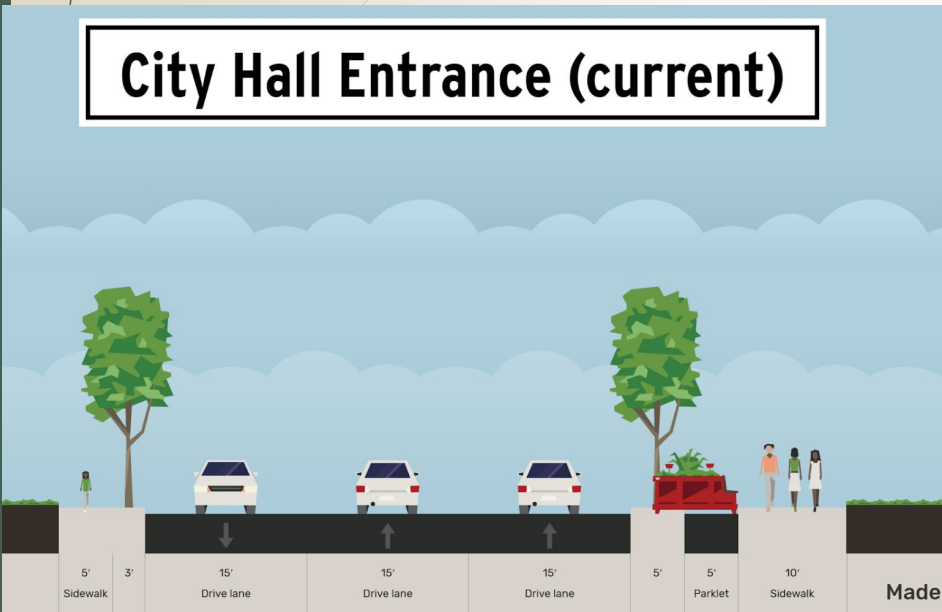

Jeannette, Pennsylvania
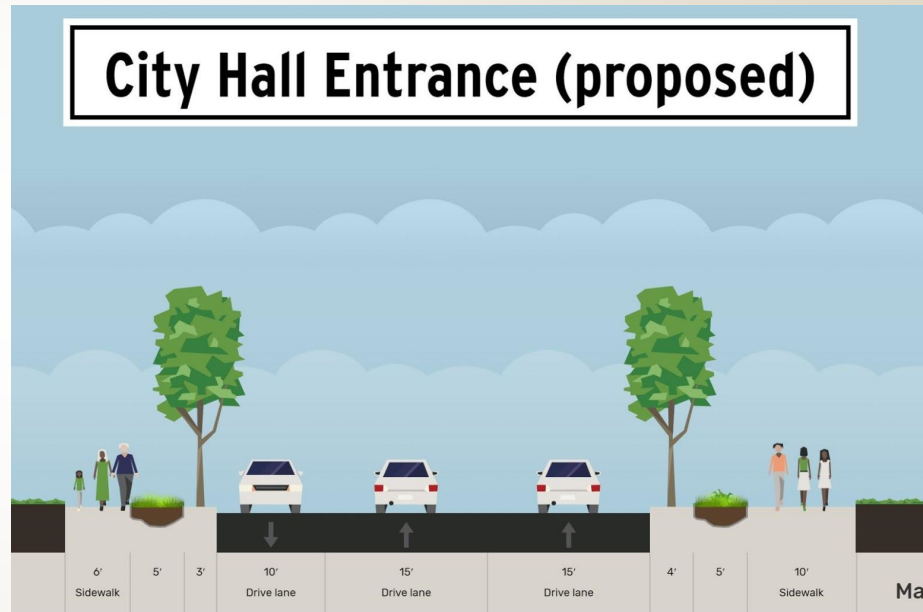

Jeannette, Pennsylvania

Action 4: Street design standards.(for example)

City Hall Entrance (current)

| 5' Sidewalk | 3' | 15' Drive lane | 15' Drive lane | 15' Drive lane | 5' | 5' Parklet | 10' Sidewalk | Made |

City Hall Entrance (proposed)

| 6' Sidewalk | 5' | 3' | 10' Drive lane | 15' Drive lane | 15' Drive lane | 4' | 5' | 10' Sidewalk | Ma |

| # Funding

❏ Virginia Tourism Corporation (VTC），Marketing Leverage Program

https://www.vatc.org/grants/

❏ Virginia Tourism Corporation (VTC），DMO WanderLove Recovery Grant Program

https://www.vatc.org/coronavirus/brand-response-marketing/campaign-wanderlove/

❏ Kilmarnock Community Sports Trust

https://www.foundationscotland.org.uk/coronavirus-appeal/whats-been-funded/kilmarnock-community-sports-trust/

Conclusion:

Urban Canopy:
- ❖ Increase the Walkability and Attractiveness of the town

- ❖ Increase the biodiversity by providing habitat for birds and other native wildlife

- ❖ Raise the awareness of green infrastructure
Water
- ❖ Improve the stormwater adjustability

Conclusion:

Cultural :

❖ Enhance the connection and integration of current community and historical resources

❖ Create more complete wayfinding and accessible guiding system for visitors

Recreation:

❖ Provide more elder-friendly recreation resources

❖ Take the long-term development of town into consideration